

REMARKS

Claims 12 and 14 have been canceled and new claims 21-26 have been added. No new matter was added. Thus, claims 1, 2, 7-11, 13 and 15-26 are pending in the present application for further prosecution. Applicants submit amendments and arguments for overcoming the rejections based on the prior art of record. No new matter was added. Accordingly, Applicants respectfully submit that claims 1, 2, 7-11, 13 and 15-26 are in condition for allowance.

I. Claim Rejection - 35 USC §103(a)

A. *In the non-final Office Action dated September 1, 2010, claims 1, 2, 10-14, 17 and 20 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 6,619,537 B1 issued to Zhang et al. in view of JP 07-268617 A.*

Independent claims 1 and 17 of the present application have been amended to require a majority of the backing plate alloy to be made of copper (Cu). Here, the term majority, of course, refers to greater than 50wt% Cu. No new matter was added. For example, see Example Nos. 1-3 disclosed on page 9, Table 1, of the present application, as filed. Example No. 1 includes 97.6wt% Cu, and Example Nos. 2 and 3 each include 96.2wt%. Thus, the alloys of the present invention are made mostly of copper and require certain limited amounts of other elements for reasons stated in the present application, as filed. New dependent claims 21-26 have been added to further distinguish the present invention from the cited prior art. The alloys claimed in new claims 21-26 are supported by Example Nos. 1-3 disclosed on page 9, Table 1, of the present application, as filed.

In the Office Action, it is readily admitted that Zhang et al. fail to disclose, teach or suggest a copper alloy backing plate including nickel (Ni), silicon (Si), magnesium (Mg), chromium (Cr), or beryllium (Be) or to provide any common sense reason for their addition in

the backing plate alloy. Instead, JP '617 is cited for a disclosure of Ni, Si, Mg and Cr in a target and backing plate.

Applicants respectfully request reconsideration of this rejection based on it not being obvious to one of ordinary skill in the art to modify the teaching provided on column 1, lines 62-64, of Zhang et al. with the teachings provided in JP '617. Applicants respectfully submit that the disclosed alloys are entirely different and there is no common sense reason for such a modification.

Column 1, lines 62-64, of Zhang et al. disclose a high purity copper sputtering target bonded to a copper or copper alloy backing plate. In contrast, JP '617 discloses an aluminum (Al) alloy target integral with a backing plate made of the same aluminum (Al) alloy. Accordingly, the targets and the backing plates of Zhang et al. and JP '617 are made of entirely different materials.

More specifically, JP '617 discloses an Al-M alloy in which "the content of M is controlled to 1-40wt%". Thus, even if M is Cu, Cu would be present only within a range of 1 to 40% with Al content being 60 to 99wt%. Thus, the majority of the alloy of JP '617 is aluminum (Al), not copper (Cu) as required by each of independent claims 1 and 17 of the present application. Accordingly, Applicants respectfully submit that JP '617 relates to an alloy in which the major component is aluminum, not copper, and that it would not be obvious for one of ordinary skill in the art to modify a copper alloy with teachings relative to an aluminum alloy. There is no common sense basis with respect to such additions providing the same effect in the different alloys. It should also be noted that the backing plate of JP '617 is for use with a sputtering target of the same Al-M alloy as the backing plate and not with a high purity copper target as required by the Zhang et al. patent.

Accordingly, Applicants respectfully submit that the subject matter required by claims 1 and 17, as amended, of the present application would not have been obvious to one of ordinary skill in the art at the time the present invention was made. Applicants respectfully request reconsideration and removal of the rejection.

B. *In the non-final Office Action dated September 1, 2010, claims 2, 7-9, 18 and 19 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 6,619,537 B1 issued to Zhang et al. in view of JP 07-268617 A and further in view of JP 03-079734 A.*

Claims 2 and independent claim 17 of the present application clearly require the presence of a stated amount of nickel (Ni), 2 to 4wt%, in the copper alloy backing plate which is comprised mostly of copper with minor amounts of specifically added elements.

As stated above, column 1, lines 62-64, of Zhang et al. disclose a high purity copper sputtering target bonded to a copper or copper alloy backing plate. However, in direct contrast, JP '617 discloses an aluminum (Al) alloy target integral with a backing plate made of the same aluminum (Al) alloy. Accordingly, the targets and the backing plates of Zhang et al. and JP '617 are made of entirely different materials and one of ordinary skill in the art would have no common sense reason for modifying a copper alloy backing plate made mostly of copper with teachings from an aluminum alloy backing plate made mostly of aluminum. These materials are clearly different and will have different properties and additives thereto will produce entirely different results. Thus, as argued above, one of ordinary skill in the art would not find it obvious to modify the teachings of Zhang et al. based on the teachings of JP '617.

In addition, JP '734 discloses a copper alloy with 0.05 to 0.8wt% chromium (Cr) with the balance being copper. Thus, JP '734, similar to Zhang et al., discloses a copper alloy with no content of nickel (Ni). Thus, the backing plate copper alloy of Zhang et al. modified in view of

JP '734 would contain no nickel (Ni) as there is no common sense teaching provided by Zhang et al. or JP '734 with a need or desire for a prescribed amount of nickel content. JP '617 discloses an Al-M alloy where Al is 60wt% to 99wt% and "M" is copper or nickel, not both. Thus, JP '617 discloses an Al-Cu alloy or an Al-Ni alloy. Accordingly, Applicants respectfully submit that the backing plate alloy required by claims 2 and 17 of the present application would not have been obvious based on the teaching of Zhang et al. modified according to JP '617 and JP '734 because neither Zhang et al. nor JP '734 disclose the inclusion of nickel (Ni) and JP '617 only includes nickel with aluminum, not with copper.

Accordingly, Applicants respectfully submit that the subject matter required by claims 2, 7-9, 18 and 19 of the present application would not have been obvious to one of ordinary skill in the art at the time the present invention was made. Applicants respectfully request reconsideration and removal of the rejection.

C. *In the non-final Office Action dated September 1, 2010, claims 15 and 16 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 6,619,537 B1 issued to Zhang et al. in view of JP 01-180976 A of Ishikura.*

Zhang et al. fail to disclose the inclusion of a prescribed amount of Be content in a copper alloy backing plate or any common sense reason for such inclusion. JP '976 discloses the addition of 100 to 3000wtppm (0.01 to 0.03wt%) of Be to a copper backing plate. However, JP '976 also requires the following:

"Purpose: To obtain a backing plate for sputtering capable of being easily detached from a Cu substrate after use without causing thermal press bonding to the substrate"; and

"A backing plate for sputtering by which a high purity Cu substrate having an adhered target material is held in a contact state ... the diffusion of Cu is inhibited by the added elements ... The plate ... prevents thermal press bonding to the Cu substrate during use."

Thus, JP '976 teaches an assembly in which Be or another element is added to the backing plate so that the backing plate will not become bonded or diffusion bonded to the target. JP '976 desires the backing plate to be "easily detached" from a copper target after use in a sputtering operation and requires the backing plate and target to be in a "contact state" with the diffusion of Cu being inhibited. In addition, JP '976 clearly teaches that the assembly must "prevent thermal press bonding" during use.

Accordingly, whereas Zhang et al. require "diffusion bonding" (see the title of Zhang et al.), JP '976 specifically states that diffusion bonding should be inhibited and that no bonding should take place so that the backing plate can be "easily detached" from the target. Based on these completely contrary and opposite teachings, Applicants respectfully submit that it would not have been obvious for one of ordinary skill in the art to combine or modify any teachings of Zhang et al. with JP '976 at the time the present invention was made.

JP '976 specifically requires a backing plate (3) (see FIGs. 1 and 3 of JP '976) to be held in direct contact with the target (1) via the use of an annular mounting jig (2) with mechanical fasteners. The purpose of the additive element in the copper alloy backing plate of JP '976 is to prevent thermal compression bonding with the target. Accordingly, the target and backing plate assembly taught by JP '976 intentionally avoids forming an assembly based on bonding of the backing plate to the target, more specifically diffusion bonding the backing plate to the target. Thus, JP '976 teaches away from a target diffusion bonded to a backing plate.

Claim 15 of the present application requires the structure of the assembly to include a target diffusion bonded to a backing plate. Accordingly, one of ordinary skill in the art would not find the invention claimed in claim 15 of the present application to be obvious because JP '976 teaches that the addition of Be will "inhibit" diffusion bonding and will prevent bonding of

a target to a backing plate so that the target can be readily and easily detached from the backing plate after use.

Applicants respectfully submit that claim 15 is patentable over Zhang et al. in view of JP '976 for this reason. One of ordinary skill in the art adding Be to a copper backing plate would follow the teachings of JP '976 since it relates to the use of Be and since it clearly requires use of an annular jig (2) when Be is added. If one of ordinary skill in the art desired diffusion bonding based on the teachings of Zhang et al. at the time the present invention was made, they would have heeded the teachings of JP '976 and would not have added Be. Rather, one of ordinary skill would have avoided the addition of Be based on the clear teachings of JP '976 and the desire of the backing plate to be readily detachable from the target after use. Applicants respectfully request reconsideration and removal of the rejection for at least this reason.

II. Conclusion

In view of the above amendments and remarks, Applicants respectfully submit that the claim rejections have been overcome and that the present application is in condition for allowance. Thus, a favorable action on the merits is therefore requested.

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